

# We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

186,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index  
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?  
Contact [book.department@intechopen.com](mailto:book.department@intechopen.com)

Numbers displayed above are based on latest data collected.  
For more information visit [www.intechopen.com](http://www.intechopen.com)



# Perceptions of Women toward Non-Pharmacological Methods for Pain Relief during Labor

*Teketel Ermias Geltore and Abiy Tadesse Angelo*

## Abstract

The experience of childbirth is subjective and has multidimensional components through which every woman passes in different ways. It is one of the most beautiful episodes in mother's life, related to happiness and celebration. However, childbirth is also associated with negative emotions such as anxiety, low sense of safety, and expectation of pain. Strong and persistent pain that is associated with labor may negatively affect both mother and fetus. During labor, a woman is dealing not only with the contractions but also with the belief that the culture has made for her. Although childbirth is viewed as a normal physiological process, it can produce significant pain that requires effective pain management. The non-pharmacological approach includes a wide variety of methods to address labor pain, which prevent suffering by enhancing the psychological and spiritual components. The non-pharmacological methods of labor pain relief require patient's preparation and antenatal education. The non-pharmacological methods that used to relief labor pain are massage, acupuncture, continuous support, positioning, breathing techniques, water immersion, music therapy, and biofeedback are some of the techniques used to achieve an effective coping level for women. The aim of this chapter is to explore women's perception toward non-pharmacological methods during labor.

**Keywords:** attitude, non-pharmacological methods, pain relief, childbirth, pain, parturition, obstetric, perceived barriers

## 1. Introduction

"In pain you will bring forth children" (Gen. 3-16). Thenceforth, labor pain was considered as a punishment given by God due to Eve's sin and then asking for relief was presumably against God; for this belief in 1591, Eufane Ayane of Edinburgh was buried alive into a pit because she asked for pain relief during her difficult labor [1, 2]. Labor pain is one of the major issues women faces during childbirth; thus then, most women want to relief it. Spontaneous vaginal delivery is one of the most distressing pains that majority of women would experience during their lifetime [3-5]. A study done in United Kingdom depicted that 93.5% of the women described the pain as severe, while in Finland, 80% described intolerable [6]. Besides this, laboring mothers experienced 10.9% severe acute postpartum pain in 36 hours, 9.8% persistent pain, and 11.2% depression at 8 weeks [7]. Although strong and persistent pain during labor might not be considered as a source of complication for a healthy patient, it stimulates the sympathetic nervous system, which causes an increase in

the heart rate, blood pressure, sweat production, endocrine hyperfunction, delays the patient's prognosis, and traumatic childbirth experiences. However, many of these sequelae of pain are mitigated by appropriate pain relief methods [5, 8–11]. Management of labor pain has remained a clinical issue and is as old as human kind. Labor pain perception varies in onset, timing, duration, and severity. Effective management of labor pain results in greater maternal satisfaction with the birth process [12, 13]. The study result from systematic review showed that factors that increased maternal satisfactions during labor are companionship with the caregivers, involvement in decision-making, and assuming health facility as their home [14]. Moreover, this will help women to conserve their energy to cope with the pain in a less destructive way. Non-pharmacological measures of pain relief are exploited because they are safer and tend to cause fewer interventions [15]. The aim of this chapter is to explore laboring mothers' attitude toward various non-pharmacological methods and perceived barriers to use these methods. The chapter also identified the commonly used non-pharmacological methods during childbirth.

## **2. Laboring mothers attitude toward non-pharmacological techniques for pain relief**

Non-pharmacological methods of pain management are grouped into three: cognitive, physical, and emotional. For instance, relaxation and breathing techniques work at mind level. Massage, position change, and TENS are congregated at cutaneous level. Touch and reassurance are grouped at emotional level [9]. Even if most women report labor is painful, a good number of physicians remarkably have little awareness about it. Pain is a subjective experience involving a complex interaction of physiologic, psychosocial, cultural, and environmental influences. The study findings from narrative inquiry revealed that use of pain relief methods was missing, although women expressed need for pain relief. Moreover, the same study results showed that there was inadequate physical and emotional support for women during childbirth [16]. A literature review from India showed that some doctors perform certain interventions on women without questioning and justification. Furthermore, people who support during homebirth have no permission to enter the delivery room in health facilities [17]. On the other hand, other study findings showed that laboring mothers during childbirth were satisfied and interested in labor pain relief services. A systematic review conducted at Toronto revealed that women allocated to continuous support were more likely to have a spontaneous vaginal birth, shorter labor, and satisfaction with the care, and in contrary less likely to have intrapartum analgesia, operative deliveries, and report frustration [18]. A randomized prospective comparative study was done on 100 primigravida women in active phase of labor by dividing them into music group (n = 50) and control group (n = 50); the result showed that the music group had substantial lower serum cortisol levels than the control group. Thus, music therapy is effective in reducing stress levels and increasing satisfaction in the women during active labor [19]. The study conducted in Poland depicted that most of the women were interested in non-pharmacological methods to relieve labor pain [20]. An integrative review was employed, and the result showed that most laboring mothers were excited in each non-pharmacological method since acupuncture and acupressure worked on physiological and subjective aspects of pain. Warm bath, music therapy, aromatherapy, and breathing techniques promoted relaxation and decreased the levels of anxiety. Thermal therapies were used as local analgesia in regions affected by pain. Exercises with the Swiss ball were important for pain relief [21]. A randomized trial was conducted on 74 primigravida women, and the finding

showed that the experimental group was found to have higher levels of maternal luxury during labor as well as 2 hours after delivery. Besides, they experienced less labor pain and have a shorter duration of the first stage of labor than the control groups [22]. The study conducted in Australia revealed that labor pain scoring mechanism was the same among mothers and midwives at mild-moderate pain levels, but midwives considerably undervalued the severe labor that was reported by mothers [6]. Women differ in their choices as to whether the various pain relief methods are effective in decreasing their labor pain and different pain relief approaches could enable them to relax. However, women who used medication were more likely to experience a sense of guilt, drug side effects, while non-pharmacological methods could allow women to actively work with their physiological responses and create a good team spirit with their care providers throughout in their postnatal periods [23].

### **3. Perceived barriers to use non-pharmacological methods**

The study done in Ghana showed that some women do not obtain an ample pain management during labor because of poor antenatal education on labor pain management and insufficient support from health professionals and their families [16]. In developing countries in spite of having labor analgesic services, most women still go through sore labor due to lack of knowledge about the techniques and a negative attitude of caregivers toward the methods. Since then, the patients get little information about pain management from their relatives but not from care providers directly; in turn, this created a wide gap in communication between laboring women and obstetric care providers [1, 5, 17]. One study identified perceived barriers to use non-pharmacological techniques, for instance, lack of time, inadequate knowledge about the options, regulatory issues, and patient reluctance of analgesia [24]. Most health-care systems are often poorly developed; the provision of analgesia is seen with low importance in comparison with the treatment of other diseases, and rudimentary properties such as water and current may not be accessible [25]. Shortage of finance, unavailability of the methods, and care providers little trainings are significant barriers to improving this situation. Therefore, it is not astonishing that the provision of analgesics is problematic [26]. Many other studies' findings showed that key issues that affect the practice of labor analgesia in developing countries by caregivers are unavailability of materials, health-care delivery systems, understanding, and strong belief. From these, awareness, outlooks, and abilities of care provider are chief factors. Moreover, misunderstandings such as harm to baby and doubt on the efficacy of non-pharmacological methods [27–30] are other factors. Labor pain management in the developing world is meager. Consequently, mothers experience unmeasured grief, let alone analgesia [31].

The individual appearances of pain, as well as other the aspects that influence the perception of pain shift responsibility to the health caregiver to ensure that the laboring woman can decide about pain relief in labor meaning, midwife's activities should be influenced by the woman's preference of pain relief methods that obtainable to her. When these options are presented to them during the antenatal period, then they can easily choose the applicable methods [16]. Since pain relief in labor is an important aspect to laboring women during childbirth, efforts should be made to evaluate its improvement through confirming their satisfaction, and unalleviated, labor pains may influence negatively on the lives of parturient and her baby [3]. Some non-pharmacological techniques need professionally competent and qualified health-care providers, especially in acupuncture, TENS, and reflexology [21]. Some methods are not provided due to their



cost. For instance, biofeedback and TENS units are costly and difficult to charge [9]. Evidences showed that many health-care professionals lack adequate knowledge and attitude for effective management of labor pain, leaving women and their baby to endure a reduced functional and psychological quality of life [28]. The need for women to receive complete information on the risks, the benefits, and provision of varied approaches is so that women have access to those methods that meet with their beliefs, as well as to those that they may need if their experiences differ from their expectations [23]. Regarding, service care providers' hurdles, staff's knowledge and attitudes on advancement their knowledge through incessant training programs and participating on conferences by themselves or facility regulations, that reflect on the quality and type of pain assessment and management. Therefore, inadequate knowledge remains a significant barrier to pain management. On a more positive note, health-care providers in their study said that teaching hospital environments influenced their ability to provide the techniques because more emphasis was placed on evidence-based care. As regards patient-related obstacles, in most facility settings, during labor and delivery, women were alone and often afraid by the intermittent shifting of obstetricians, midwives, and nurses [32–34]. Nurses and midwives are aware of some non-pharmacological labor pain management methods and use them in their practice. A good number of non-pharmacological techniques remain unknown to them. Some of the reasons for the usage of non-pharmacological techniques include their non-invasiveness, inexpensive nature, ease of use, safety, comfort enhancement, and bonding. Yet, barriers such as misconceptions about their efficacy, insufficient staff, and resources prevent optimal use by nurses and midwives [35]. The notion that labor pain is natural and must be endured should be changed during health education programs because it is the right of every woman to have suitable pain relief during labor. Midwives should support and encourage women during labor, and a good relationship between the midwife and the woman in labor is advocated so that women will seek professional care as well as cultural background of the woman in labor must be taken into consideration because some are socialized to be stoic. Therefore, labor pain must be assessed adequately to inform effective pain management [36]. The most commonly utilized non-pharmacological methods during childbirth include transcutaneous electrical nerve stimulation (TENS) [37–39], hypnosis [40, 41], acupuncture [42, 43], music [19], water immersion [44], continuous support [18], and biofeedback [45].

Based on the available scientific articles, the most commonly utilized non-pharmacological methods during labor and delivery are identified. Moreover, how the methods work is also reviewed.

### **3.1 Transcutaneous electrical nerve stimulation (TENS) for pain management in labor**

A low voltage electrical impulse, which differs in frequency and intensity, will be delivered to the skin through four pads that are placed over the lower back with a boost during uterine contractions [9, 13, 46–48].

#### *3.1.1 How does TENS work?*

TENS is effective when there are large diameter nerves, with high frequency and low intensity, which results in transmission of impulses at high frequency and the release of endorphins that bind to opiate receptors, which increases pain tolerance [13, 47, 49].

### 3.1.2 Application of electrodes

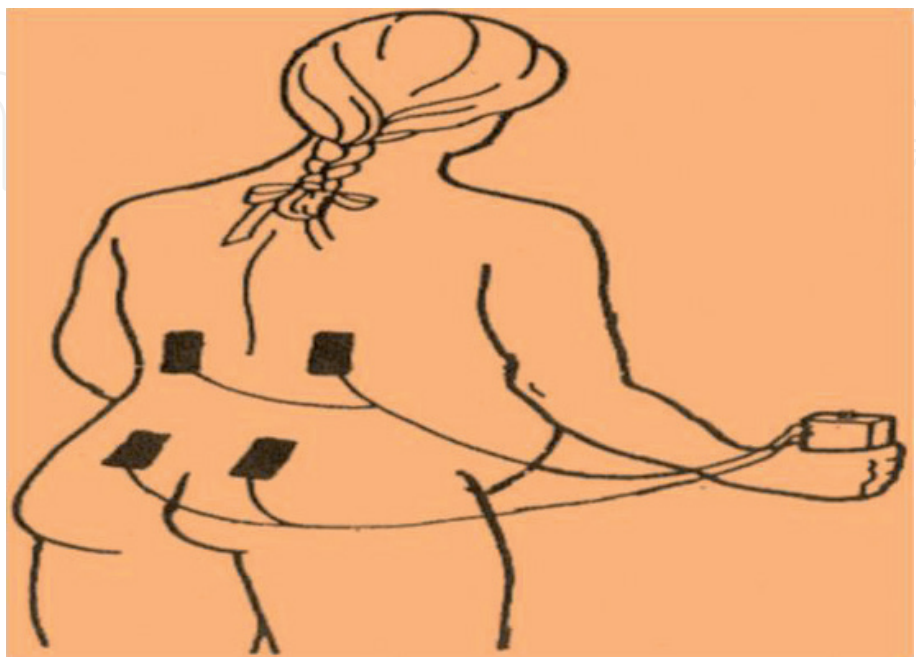
There are various types of electrodes in terms of frequency and pulse width. Top pair of electrodes will be placed at T<sub>10</sub>-L<sub>1</sub>, and the lower pair of electrodes at S<sub>2</sub>-S<sub>4</sub> (**Figure 1**) [13]. A randomized controlled trial was conducted on 1466 women from 17 trials, 13 examined TENS; 2 used acupuncture, and 2 place on the cranium. Overall, there was a slight variation in pain records between TENS and control groups. The majority of laboring mothers using TENS responded that they would be willing to use it again in their next pregnancies. There was no any evidence that TENS had any positive or negative impact on the mother and newborn [24].

### 3.2 Acupuncture

Acupuncture is one of Chinese traditional medicines, which became wide-spread and popular in some Western countries. Experts in the field assume that health is dependent on the correct flow of energy through the meridians (Qi), through the body (14 meridians). These meridians are responsible for the control the activities of the vital organs in the body. During illness, the energy flow will be imbalanced [13, 46, 49].

#### 3.2.1 How does acupuncture work?

Acupuncture involves the insertion of fine needles into various parts of the body. The technique is aimed to treat illnesses and alleviate pain by stimulating acupuncture points. Acupuncture points used to relief labor pain are located on the hands, feet, and ears. Acupuncture stimulates nervous system, spinal cord by locking touch fibers and then block pain impulses at the pain gates, and finally help the body to release endorphins [47]. Randomized controlled trials employed found that women randomized to acupuncture had slightly reduced pain scores and decreased use of the pharmacological methods than the control groups [46]. Another randomized controlled trial was conducted on 303 nulliparous women with normal pregnancies revealed that the mean VAS scores were 66.4 in the MA



**Figure 1.**  
A TENS unit in use [50].

group, 68.5 in the EA group, and 69.0 in the SC group. The study also showed that 2 months after birth recollection of labor pain, no significant differences were found among the groups and women's feeling in the EA group reported acupuncture as being effective for labor pain than MA, MA, spent less time in labor, and had less blood loss. Finally, the study revealed that no serious impacts of acupuncture treatment were reported [40].

### **3.3 Touch and massage**

Massage is one of the natural pain relief methods. Touch is important in terms of positioning, decreases muscle spasms, relieves labor pain, decreases anxiety, and results in good labor outcomes [9, 13, 47, 48, 51].

#### *3.3.1 How does touch and massage work?*

In the context of physiology, touch and massage increase endorphins and oxygen supply to tissues and then stimulate nerves, which decrease pain. Studies suggest that those mothers who utilize them may have shorter labors, reduced postpartum depression, shorter hospital stays, and increased patient satisfaction. Not many potential risks were reported for mother and baby; thus, it is an excellent method to decrease labor pain [13, 48, 49, 52].

### **3.4 Continuous labor support**

Continuous labor support refers to the nonmedical support of the woman in labor by a trained person, e.g., a doula, consistently has decreased the use of obstetric interventions [46]. Evidence indicates that continuous support during labor has a number of measurable positive impacts on key birth outcomes when compared to intermittent support like; continuous support is associated with less use of pharmacological techniques, fewer operative deliveries, and more reports of satisfaction with birth, and moreover, it has clinically meaningful benefits for women and infants [18, 46, 48, 51, 53]. **Figure 2** shows continuous labor support from the family.

### **3.5 Hydrotherapy**

Pain alleviating mechanism of water has been known for many years. In the past decades, laboring mothers were interested in hydrotherapy due to its comfort [13].



**Figure 2.**  
*Continuous support from family childbirth connection since 1918 ([www.childbirthconnection.org](http://www.childbirthconnection.org)).*

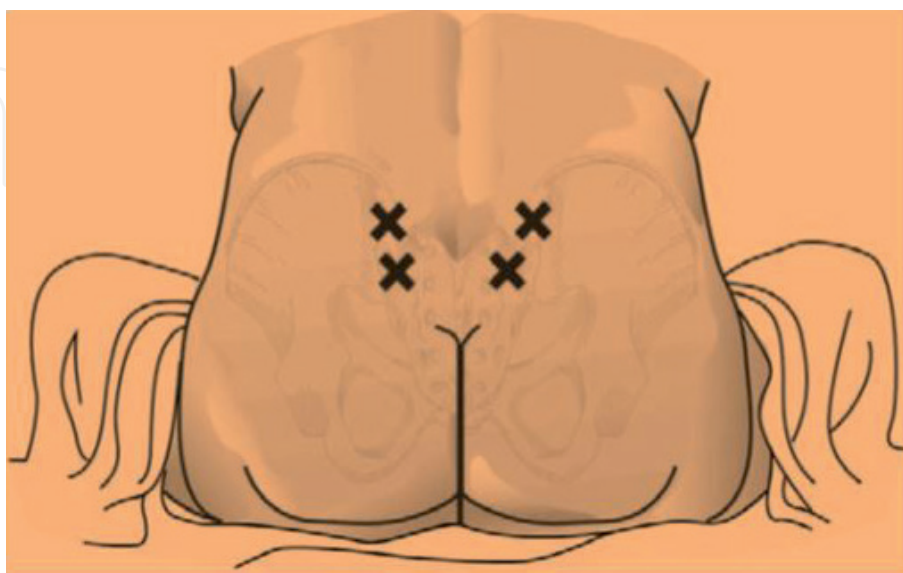
### 3.5.1 How does hydrotherapy work?

Hydrotherapy comprises of two methods, such as an aspersion bath and sterile water injection, discussed below. The aspersion bath enhances relaxation and reduces stress levels and then decreases sense of pain. Examining the neuroendocrine parameters, this method minimizes the release of cortisol and  $\beta$ -endorphins, but it increases the secretion of noradrenaline [54, 55].

Intradermal injections of sterile water in the sacral area may be used to decrease back pain in labor, and it causes a burning sensation that is much more painful than saline injection and thought to relieve labor pain by counter irritation. Women who received injections of sterile water were more interested in receiving the injections in a subsequent labor than women who received saline injections [56]. Randomized control trial was conducted on 393 women using the tub during labor and a control group of 392 women receiving routine care. Women experienced less pain after water immersion than those who received routine, and more than 80% of the water immersion group said they would use the tub in subsequent labors (**Figure 3**) [57].

### 3.6 Music therapy

Music is a type of non-pharmacological technique, which is non-invasive, non-medical, cost-effective, and easily accessible. Music heals the soul and influences immune and endocrine function. Nowadays, many studies oriented into the therapeutic effectiveness of music in the field of obstetrics and revealed that music during childbirth promotes wellbeing of the mother and the fetus [9, 52]. Randomized control trial was done on 100 primigravida in active labor showed that there was no significant difference between both the groups in serum cortisol at pretest, whereas the group differences after the music therapy sessions indicated that the music group had significant lower serum cortisol levels compared to the control group. Thus, music therapy is effective in reducing stress levels in the women during active labor [19].



**Figure 3.**  
*Placement of intradermal water blocks: four intradermal injections of 0.05 to 0.1 mL of sterile water to form four small blebs over each posterior superior iliac spine and 3 cm below and 1 cm medial to each spine [51].*



4. Conclusion

The studies revealed that transcutaneous electrical nerve stimulation, immersion bath, acupuncture and acupressure, touch, massage, continuous support, hydrotherapy, and music therapy are effective methods for pain relief during labor. Besides this, they reduce pain perception, levels of anxiety, and stress and indicated laboring mothers who used these methods did not report the need for pharmacological methods.

Although these methods are cost-effective and non-invasive, there are barriers that impeded to using the techniques as per needed. Perceived barriers can be broken up into three categories: barriers related to the patient, the clinicians, and the health-care system as a whole. To be successful in the use of non-pharmacological pain relief in labor, obstetric caregivers must have to develop positive attitude toward non-pharmacological labor analgesia and women need to be aware of different alternatives available to them.

All future randomized trials must be adequately powered in evaluation of complementary and alternative techniques for pain management in labor as they are needed for improving the quality and reporting of future trials. In particular, consideration should be given to the analysis and reporting of the person providing the intervention, for example, their training, length of experience, and relationship to the woman.

Finally, the findings of this chapter point to the need of clinical research particularly in midwifery care focusing on the use of these and other non-pharmacological strategies for pain relief during labor, aiming to humanize care for women during labor.

Conflict of interest

The authors report no conflicts of interest in this work.

Abbreviations

|                                  |  |
|----------------------------------|--|
| EA                               | acupuncture with a combination of both manual and electrical stimulation |
| MA                               | acupuncture with manual stimulation                                      |
| SE                               | standard care  |
| S <sub>2</sub> -S <sub>4</sub>   | sacral nerve fibers 2 to 4   |
| TENS                             | transcutaneous electrical nerve stimulation                              |
| T <sub>10</sub> -T <sub>11</sub> | thoracic nerve fibers 10 to 11   |
| VAS                              | visual analog scale  |

IntechOpen

## Author details

Teketel Ermias Geltore<sup>1\*</sup> and Abiy Tadesse Angelo<sup>2</sup>

1 Midwifery Department, School of Nursing and Midwifery, College of Health Sciences and Medicine, Wachemo University – Durame Campus, Durame, Ethiopia

2 Nursing Department, School of Nursing and Midwifery, College of Health Sciences and Medicine, Mizan Tepi University, Mizan Aman, Ethiopia

\*Address all correspondence to: [teketelermias@gmail.com](mailto:teketelermias@gmail.com)

## IntechOpen

© 2020 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

## References

- [1] Tasnim S. Perception about pain relief during normal labor among health care providers conducting delivery. *MedPage Today*. 2010;**22**(1):20-23. DOI: 10.3329/medtoday.v22i1.5600
- [2] Pugliese PL, Cinnella G, Raimondo P, De Capraris A, Salatto P, Sforza D, et al. Implementation of epidural analgesia for labor: Is the standard of effective analgesia reachable in all women? An audit of two years. *European Review for Medical and Pharmacological Sciences*. 2013;**17**:1262-1268
- [3] Lawani LO, Eze JN, Anozie OB, Iyoke CA, Ekem NN. Obstetric analgesia for vaginal birth in contemporary obstetrics: A survey of the practice of obstetricians in Nigeria. *BMC Pregnancy and Childbirth*. 2014;**14**:1. DOI: 10.1186/1471-2393-14-140
- [4] El-Wahab N, Robinson N. Analgesia and anesthesia in labor. *Obstetrics, Gynecology & Reproductive Medicine*. 2011;**21**:137-141. DOI: 10.1016/j.ogrm.2011.02.006
- [5] Karn S, Yu H, Karna S, Chen L, Qiao D. Women's awareness and attitudes towards labor analgesia influencing practice between developed and developing countries. *Advances in Reproductive Sciences*. 2016;**4**(2):46-52
- [6] Baker A, Ferguson SA, Roach GD, Dawson D. Perceptions of labor pain by mothers and their attending midwives. *Journal of Advanced Nursing*. 2001;**35**:171-179
- [7] Soet JE, Brack GA, Dilorio C. Prevalence and predictors of women's experience of psychological trauma during childbirth. *Birth Issues in Perinatal Care*. 2003;**30**:36-46
- [8] Apondi C. A Survey of the knowledge attitude and practice regarding epidural labor analgesia among obstetricians at the Kenyatta National Hospital [master's thesis]. Kenya: University of Nairobi; 2012
- [9] Cochrane AR. Perceptions of Labor and Delivery Clinicians on non-pharmacological Methods for Pain Relief during Labor. 2015. Available from: <https://digitalcommons.brockport.edu/cgi/viewcontent.cgi?article=1093&context=honors> [Accessed: March 2016]
- [10] Ding T, Wang DX, Qu Y, Chen Q, Zhu SN. Epidural labor analgesia is associated with a decreased risk of postpartum depression: A prospective cohort study. *Anesthesia and Analgesia*. 2014;**119**(2):383-392
- [11] Geltore TE et al. Perceptions of obstetric analgesia: A qualitative study among midwives attending normal vaginal deliveries in Durame Hospital, Southern Ethiopia. *Journal of Pain Research*. 2019;**12**:2187-2192
- [12] Okojie NQ, Isah EC. Perception of epidural analgesia for labor among pregnant women in a Nigerian tertiary hospital setting. *Journal of the West African College of Surgeons*. 2014;**4**(4)
- [13] Habanananda T. Non-pharmacological pain relief in labour. *Journal of the Medical Association of Thailand*. 2004;**87**(Suppl 3):S194-S202
- [14] Hodnett ED. "Pain & women's satisfaction with the experience of childbirth": A systematic review. *American Journal of Obstetrics and Gynecology*. 2002;**186**(Suppl):S160-S172
- [15] Osório SMB, Silva Júnior LG, Nicolau AIO. Evaluation of the effectiveness of non-pharmacological methods for pain relief during labor. 2014;**15**(1):174-184. DOI: 10.15253/2175-6783.2014000100022. Available from: [www.revistarene.ufc.br](http://www.revistarene.ufc.br)

- [16] Ampofo EA, Caine V. A narrative inquiry into women's perception and experience of labor pain: A study in the western region of Ghana. *International Journal of Africa Nursing Sciences*. 2015;**3**:86-93
- [17] Zionts S. Ouch, that hurts: Childbirth-related pain management and the inappropriate replacement of traditional obstetrical knowledge in Kumaon, Uttarakhand, India. In: *Independent Study Project (ISP) Collection Paper*. Vol. 2081; 2015. Available from: [http://digitalcollections.sit.edu/isp\\_collection/2081](http://digitalcollections.sit.edu/isp_collection/2081)
- [18] Hodnett ED, Gates S, Hofmeyr GJ, Sakala C. Continuous support for women during childbirth. *Cochrane Database of Systematic Reviews*. 2013;(7):CD003766. DOI: 10.1002/14651858.CD003766.pub5
- [19] Geetha S, Anusha GK. Effect of music therapy on serum cortisol in primigravida in active labor. *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*. 2016;**15**(4(Ver. III)): 91-94
- [20] Pilewska-Kozak AB, Klaudia P, Celina Ł-K, Beata D, Grażyna S, Magdalena B. Non-pharmacological methods of pain relief in labor in the opinion of puerperae – A preliminary report. *Annals of Women's Health*. 2017;**1**(1):1005
- [21] Mascarenhas VH, Lima TR, Silva FM, Negreiros FS, Santos JD, Moura MA, et al. Scientific evidence on non-pharmacological methods for relief of labor pain. *Acta Paulista de Enfermagem*. 2019;**32**(3):350-357
- [22] Chuntharapat S et al. Yoga during pregnancy: Effects on maternal comfort, labor pain and birth outcomes. *Complementary Therapies in Clinical Practice*. 2008;**14**:105-115
- [23] Thomson G et al. Women's experiences of pharmacological and non-pharmacological pain relief methods for labor and childbirth: A qualitative systematic review. *Reproductive Health*. 2019;**16**:71. DOI: 10.1186/s12978-019-0735-4
- [24] Almushait M, Ghani RA. Perception toward non-pharmacological strategies in relieving labor pain: An analytic descriptive study. *Journal of Natural Science Research*. 2014;**4**(2):5-12
- [25] Hodges SC, Mijumbi C, Okello M, McCormick BA, Walker IA, Wilson IH. Anaesthesia services in developing countries: Defining the problems. *Anaesthesia*. 2007;**62**:4-11
- [26] Soyannwo OA. Post-operative pain control – Prescription pattern and patient experience. *West African Journal of Medicine*. 1999;**18**:207-210
- [27] Ogboli-Nwasor E, Adaji S, Bature S, Shittu O. Pain relief in labor: A survey of awareness, attitude, and practice of health care providers in Zaria, Nigeria. *Journal of Pain Research*. 2011;**4**:227-232
- [28] McCauley M, Stewart C, Kebede B. A survey of healthcare providers' knowledge and attitudes regarding pain relief in labor for women in Ethiopia. *BMC Pregnancy and Childbirth*. 2017;**17**(1):56
- [29] Reena BKH, Afzal M, Mishra AK, Paul A. Labor epidural analgesia: Past, present and future. *Indian Journal of Pain*. 2014;**28**(2):71-81
- [30] Size M, Soyannwo OA, Justins DM. Pain management in developing countries. *Anaesthesia*. 2007;**62** (Suppl 1):38-43
- [31] Geltore TE, Taye A, Kelbore AG. Utilization of obstetric analgesia in labor pain management and associated factors among obstetric caregivers in public health facilities of Kembata Tembaro Zone, Southern Ethiopia. *Journal of Pain Research*. 2018;**11**:3089-3097. DOI: 10.2147/JPR.S165417



- [32] Enkin M, Keirse MJ, Neilson J, Crowther C, Duley L, Hodnett E. A Guide to Effective Care in Pregnancy and Childbirth. 3rd ed. Oxford, England: Oxford University Press Journal of Midwifery and Women's Health; 2000;47(4):293-294. DOI: 10.1016/S1526-9523(02)00253-2
- [33] Fielding R, Irwin MG. The knowledge and perceptions of nurses and interns regarding acute pain and postoperative pain control', HSRF project number: 822002. Hong Kong Medical Journal. 2006;12(Suppl 1): S31-S34
- [34] Sleutel M, Schultz S, Wyble K. Nurses' views of factors that help and hinder their intrapartum care. Journal of Obstetric, Gynecologic, & Neonatal Nursing. 2007;36(3):203-211
- [35] Boateng et al. Nurses and midwives' experiences of using non-pharmacological interventions for labor pain management: A qualitative study in Ghana. BMC Pregnancy and Childbirth. 2019;19:168. DOI: 10.1186/s12884-019-2311-x
- [36] Aziato et al. Labour pain experiences and perceptions: A qualitative study among post-partum women in Ghana. BMC Pregnancy and Childbirth. 2017;17:73. DOI: 10.1186/s12884-017-1248-1
- [37] Keskin EA, Onur O, Keskin HL, et al. Transcutaneous electrical nerve stimulation improves low back pain during pregnancy. Gynecologic and Obstetric Investigation. 2012;74(1):76-83
- [38] Rodarti PAC et al. High-frequency TENS in post-episiotomy pain relief in primiparous puerpere: A randomized, controlled trial. The Journal of Obstetrics and Gynaecology Research. 2012;38(7):980-987
- [39] Dowswell T et al. Transcutaneous electrical nerve stimulation (TENS) for pain management in labor. Cochrane Database of Systematic Reviews. 2015;2:CD007214. DOI: 10.1002/14651858.CD007214.pub2
- [40] Cyna AM, McAuliffe GL, Andrew MI. Hypnosis for pain relief in labor and childbirth: A systematic review. British Journal of Anaesthesia. 2004;93(4):505-511
- [41] Vandevusse L, Irland J, Berner MA, Fuller S, Adams D. Hypnosis for childbirth: A retrospective comparative analysis of outcomes in one obstetrician's practice. American Journal of Clinical Hypnosis. 2007;50(2)
- [42] Lee H, Ernst E. Acupuncture for labor pain management: A systematic review. American Journal of Obstetrics and Gynecology. 2004;191(5):1573-1579
- [43] Kvorning Ternov N et al. Acupuncture for pain relief during childbirth. Acupuncture & Electro-Therapeutics Research. 1998;23:19-26
- [44] College of Midwives of British Columbia. Guideline for the Use of Water in Labor and Birth. British Columbia: College of Midwives; 2001
- [45] Barragán Loayza IM, JC SI. Biofeedback for pain management during labor. Cochrane Database of Systematic Reviews. 2011;(6):CD006168. DOI: 10.1002/14651858.CD006168.pub2
- [46] Wong C. Advances in labor analgesia. International Journal of Women's Health. 2009;1:139-154
- [47] Jones L, Othman M, Dowswell T, et al. Pain management for women in labor: An overview of systematic reviews. Cochrane Database of Systematic Reviews. 2012;7(3):CD009234
- [48] Ebirim LN, Buowari OY, Ghosh S. Physical and psychological aspects of

pain in obstetrics. In: Ghosh S, editor.  
Pain in Perspective. London, UK:  
InTech; 2012

[57] Rush J et al. The effect of whirlpool  
baths in labor: A randomized controlled  
trial. *Birth*. 1996;**23**:136-143

[49] Gupta S, Anand Kumar GS,  
Singhal H. Acute pain – Labor analgesia.  
*Indian Journal of Anaesthesia*.  
2006;**50**(5):363-369

[50] Simkin P, Bolding A. Update on no  
pharmacologic approaches to relieve  
labor pain and prevent suffering.  
*Journal of Midwifery & Women's  
Health*. 2004;**49**(6):489-504

[51] Leeman L et al. The nature  
and management of labor pain:  
Part I. Non pharmacologic pain  
relief. *American Family Physician*.  
2003;**68**(6):1-8. Available from:  
[www.aafp.org/afp](http://www.aafp.org/afp)

[52] Brown ST et al. Women's evaluation  
of intrapartum non pharmacological  
pain relief methods used during labor.  
*The Journal of Perinatal Education*.  
2001;**10**(3)

[53] Ross-Davie M. Evidence Based  
Guidelines for Midwifery-Led Care in  
Labor. Scotland: The Royal College of  
Midwives; 2012

[54] Hamlac Y, Yazici S. The effect of  
acupressure applied to point li4 on  
perceived labor pains. *Holistic Nursing  
Practice*. 2017;**31**(3):167-176

[55] Henrique AJ, Gabrielloni MC,  
Rodney P, Barbieri M.  
Nonpharmacological interventions  
during childbirth for pain relief,  
anxiety, and neuroendocrine stress  
parameters: A randomized controlled  
trial. *International Journal of Nursing  
Practice*. 2018;**24**(3):12642

[56] Simkin PP, O'Hara M.  
No pharmacologic relief of pain  
during labor: Systematic reviews  
of five methods. *American Journal  
of Obstetrics and Gynecology*.  
2002;**186**(Suppl 5):S131-S159